40 kick

POPULAR Computing WEEKLY

35p 24-30 March 1983 Vol 2 No 12

This Week

Chess machines
John White looks at some of the latest chess machines to come on to the market and compares them with the "Big Three" See page 12

Psion
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Dragon games
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STAR GAME
Escape on 16K Spectrum by John Durst. See page 8.

News Desk

Software companies fight Buy'n Try scheme

by David Kelly

BUY'n Try is the name of a program exchange scheme launched by the Software Centre on Friday March 11

Commercial software for nearly every home micro can be bought from the London-based centre — either by mail-order or over the counter — and then repeatedly exchanged for other programs

Any program returned within six months of purchase is bought back by the Centre for 80 percent of its original purchase price — this is given in the form of a discount against a subsequent purchase

Some software manufacturers have condemned the Software Centre's scheme and are considering backing their complaints with legal action One has already done so

The first action has been taken by Quicksilva who applied to the High Court last Friday for a temporary injunction to stop the Software Centre from exchanging its tapes The application — heard with only Quicksilva present — was turned down As we go to press, another hearing where the Software Centre will also be able to put its case should take place on Tuesday March 22

"I think we have a good chance to stop them" said Quicksilva's Managing Director Nick Lambert "If we don't try we might as well all pack up and go home now "

Weekly four-page advertisements from the Software Centre show over 300 titles on offer with material from Sin-

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SOFTWARE CENTRE

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24-30 March Vol 2 No 12



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Hobhouse Court 19 Whitcomb Street,
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Telephone **01 839 6835**
Published by Sunshine Publications Ltd
Typesetting origination and printing by Chesham Press Chesham Bucks
Distributed by S M Distribution
London SW9 01 274 8611 Telex 261643

Subscriptions
You can have *Popular Computing Weekly* sent to your home
UK Addresses

26 issues	£9 98
52 issues	£19 55

Overseas Addresses

26 issues	£18 70
52 issues	£37 40

How to submit articles
Articles which are submitted for publication should not be more than 3 000 words long The articles and any accompanying programs should be original It is breaking the law of copyright to copy programs out of other magazines and submit them here — so please do not be tempted

All submissions should be typed and a double space should be left between each line Please leave wide margins

Programs should whenever possible, be computer printed

We cannot guarantee to return every submitted article or program so please keep a copy If you want to have your program returned you must include a stamped addressed envelope

Accuracy
Popular Computing Weekly cannot accept any responsibility for any errors in programs we publish although we will always try our best to make sure programs work.

This Week

Editorial

There can be few people now who fail to recognise ET Even if you have not seen Stephan Spielberg s blockbuster film, there have been so many newspaper reports, posters and cartoons, that you would have to be a hermit not to have come across this friendly Extra Terrestrial

However, the search for ET's home is not confined to the realms of cinematographic fantasy The search for alien life is on for real

Project SETI is a US-based operation designed to monitor the Milky Way for radio emissions of intelligent origin Paul Horowitz of Harvard, part of the SETI team has developed a prototype radio receiver which can be linked to a computer to distinguish between intelligent signals and natural radio waves When linked to a radio telescope the SETI system will tune in to 128,000 possible channels and should be able to pinpoint radio signals up to 1,000 light years away

The US Congress has recently agreed to allocate project SETI $1 5m from within the 1983 NASA budget

The search for alien life is not a new idea But, this is probably the first time a computer has been used for such a purpose If the search is successful, I will lay odds that the computer makes contact with another computer

ET come home — all is forgiven

Next Thursday

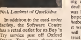
Can you avoid the rampaging lion, the ferocious hippo, and get from one side of the island to the other? Try it next week in April Fool Island — a new game for the BBC B by Nick Wilson

Software Centre furore

Continued from page 1

clair Research, Commodore, Dragon Data, and just about every other major supplier

Commodore UK's software manager Gail Wellington said 'A big commercial venture like the Software Centre could well put many smaller software houses out of business We are big enough to take it but it could well cause us to move into Rom software For us that would be a very sad decision to have to make and it would very considerably increase the cost of our programs."



Nick Lambert of Quicksilva

In addition to the mail-order facility, the Software Centre has a retail outlet for its Buy 'n Try service just off Oxford Street Two more shops are planned in the next three weeks and the company is considering expanding as a franchise operation

The exchange venture has been set up by Bill Cannings, founder of the Byte Shop chain, who formed a company called Computer Aided Systems in November 1979 We have been planning the scheme for over a year," he said 'People who buy mail-order are often unhappy with what they are sent and for the first time we are offering people a chance to buy with confidence — if they don't like it they can send it back.

"I don't think there are even the same dangers to the software manufacturers as there are in normal retail selling — we make it very clear that all the material is copyright, which is more than most retailers do

It will be obvious if someone is copying tapes at home, because they will be turning them round every couple of weeks In such cases we shall inform the manufacturers though I don t know what they can do about it "

Don Malham is manager of the first Buy 'n Try store He says "We have had an incredible response from the public Obviously we have had a certain amount of flack from some of the software houses, but they are battling upstream They think their sales will drop What we are discovering is that people are going for more expensive programs which they perhaps would not otherwise have bought

"We will not make any money on a program until about the third or fourth sale," he commented

Quicksilva claims that software for the Centre has been bought by Computer Aided Systems as a normal dealer, with no indication given that the Buy 'n Try offer was on the cards

One possible method software houses will be considering combating the exchange deal involves the way the stock was bought It is Quicksilva's hope that buying material without disclosing the fact that it was intended for exchange will nullify the original contract of sale

Bill Cannings – Software Centre head

This approach is being followed up by Bug-Byte They have given the Software Centre seven days to return all stocks of Bug Byte programs If the Centre does not comply, Bug-Byte will also bring proceedings for an injunction

Imagine's Dave Lawson was 'horrified' when he saw the advertisements "They pose such a threat that we don't care how much it will cost to stop them ' he said

Dragon Managing Director Tony Clarke commented We have sent the advertisement to our solicitors We are totally opposed to any form of hiring

"We are not seeking any sort of injunction at the moment, but we will be if the people involved do not take our advice and stop

"There are games in their list that we have not even produced yet — *Breakout/ Middle Kingdom* for one "

A spokesman for Sinclair Research commented on Friday As of this morning we are investigating " He declined to comment further

Dragon to launch two computers in 1983

DRAGON Data plans two new major machine launches this year

The machines will be aimed at very different sectors of the market and both will be more expensive than the existing Dragon 32 machine

The lower priced machine will compete with the BBC Model B machine, according to Dragon's Managing Director Tony Clarke

'It will have a lot more memory than the BBC," he said, "and in its high resolution mode it will still have 64K of user Ram for programming "

"With the BBC in its highest resolution mode you are down to only 3 or 4K of user memory,' he added

We haven't costed it out fully yet, but we are hoping for a target price of under £400 " Like the Dragon 32 the machine will require a separate TV or monitor

The second machine will be substantially more expensive "It will be a competitor for the IBM PC or Sirius " he said

Dragon will offer this more up-market machine in a range of configurations — but all models will include built-in discs and a monitor

The most expensive will feature a colour display and Winchester hard discs, and will have a price tag in excess of £3000 The least expensive option will be monochrome with floppy disc drives and will sell for around £1200

Rotten apples overturned

THE reversal of a 52-year-old court ruling by the Taiwan High Court has effectively cleared the way for Apple to continue its fight against so-called "rotten-Apples" — unauthorised copies of its computers

This legal technicality, prohibiting certain foreign companies from initiating criminal proceedings in Taiwan, has previously halted Apple's attempts to take action against two companies, which, it was alleged had infringed copyright in Apple computers

● Apple (UK) has reacted to the proposed sale of an Apple software compatible micro computer — the Peanut — reported in *Popular Computing Weekly*, March 10 Solicitors Clifford Turner, acting on behalf of Apple (UK) are investigating to see if the Peanut infringes patents or copyright registration on Apple computers

CTA meeting

THE venue for the next meeting of the Computer Trade Association has now been fixed

It will be at the Spider s Web Motel on the A41 at Watford (Junction 5 off the M1) on March 29 at 11 am



Dragon/Tandy software converter

DECODE is a cartridge from Compusense which will convert software from the Tandy Color Computer to run on the Dragon 32 and vice versa

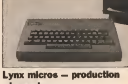
The two machines are internally very similar and both use the same version of Microsoft Basic However, although programs keyed into either machine will Run, because of variations in the input/output routines, programs recorded on tape are not compatible

The new *Decode* Rom offers a solution to this problem — giving the Dragon access to the wealth of software available for the Tandy in the US and also giving the Tandy access to British material being developed for the Dragon.

In both computers, Basic keywords are represented by a series of what are called 'tokens' When a Basic word — for example, *Goto* or *Print* — is keyed in or read off tape, it is converted by the computer into a token, unique to that keyword. The problem with software conversion is that in some cases the two machines use *different* tokens to represent the same keyword So when a program for one machine is read off tape by the other it sees the wrong Basic statements

What the *Decode* cartridge does is to go through the program after it is loaded from tape and unscramble the tokens so that it will run

Decode costs £18 95 More details from Compusense, PO Box 69, Palmers Green, London N13 5XA



Lynx micros — production stepped up

LYNX microcomputers are now beginning to filter through to the shops, but the machine is still only available from a limited number of outlets

"Dixons are still interested, but it is a bit academic with Laskys and Spectrum stores taking up our full production," said a spokesman for Lynx manufacturer Camputers

Only 900 machines were manufactured in the month to the end of February "Production is being stepped up, but it has taken rather longer than expected," he said

Camputers has now sold over 2 000 Lynx machines

Younger than he looks

WITH somewhat peculiar logic *The Guardian* has selected Clive Sinclair as Young Businessman of the Year

Clive Sinclair, who is 42 founded Sinclair Research only four years ago The company turned in profits of over £13m last year and, following a recent shares issue his personal stake in the company has been valued at almost £130m

He is the 13th person to receive the award, given each year in acknowledgement of a significant contribution to British business.

Free ports boost to micro industry

THE decision to allow a number of British free ports, announced in the Budget last week will give a boost to the UK microcomputer industry

By accepting the recommendations of a recent Treasury working party report that two or three experimental free ports should be established, the Chancellor Sir Geoffrey Howe has given British manufacturers a chance to make their goods more competitive overseas

At present companies assembling microcomputers in this country must pay a 17 per cent import duty on semiconductor chips This duty has been heavily criticised and has been the reason for many UK companies manufacturing overseas Acorn's Managing Director Chris Curry, for example, has called it 'thoroughly unacceptable'

By setting up free ports the government has provided a loop-hole No duty will have to be paid on goods imported — providing they are subsequently exported

What has still to be decided is the number of free ports that will be allowed, and their locations

In a letter to *The Times* in February, Clive Sinclair argued for the setting up of a free port in Dundee, where his ZX81 and Spectrum machines are manufactured by Timex

● In a separate Budget announcement the government pledged an additional £15m over the next three years to its software development grants scheme

Mattel adopts aggressive approach to software market

MATTEL is showing signs of a new aggressive approach to the software market

In late May, the company will launch a range of software titles for the Atari 2600 games machine

"What we intend to prove is that we can write the best software," said Mattel's European Marketing Manager Peter Fitters "We are making sure of the future — when people begin to consider buying a new machine we want them to think of us"

The decision to launch a range of Atari programs is a development of an earlier scheme in the US called M-Network

Like Atari, Mattel has been hit by competition in the video games market It made a £13 5m loss in the financial quarter to the end of January

Trans-atlantic exchange

MANCHESTER-based Terminal Software has concluded a product exchange deal with Microdigital of Webster, New York

Under the arrangement the American company has an exclusive right to distribute Terminal's *Skramble* and *Gridder* Vic20 games in the US In return, Terminal will soon be distributing Microdigital's *Pinball* game, also for the Vic20

Game designers, not programmers

REDSHIFT is a new software house — with a different approach

"We are the only company made up of games designers, not programmers," explained the company's Julian Fuller

Three titles have so far been released by the North London group *Time Lords* *Shiva Inferno* and *Murder Ball* Each has been developed from original board-games designed by Redshift

Julian, who studied board-game design at college, commented "We have a great dislike of arcade games — the micro is being done to death by people producing ever more complex versions of *Space Invaders*"

Redshift can be contacted at 12c Manor Road, Stoke Newington London N16

Escape

A new game for 16K or 48K Spectrum by John Durst

You have just jumped over the wall of the dreaded Stalag ZX and find yourself in the bottom right-hand corner of the Killing Area — the free fire zone between you and freedom.

You have been roughed up by the appalling Hardwehr guards and their murderous dogs, which have taken some nasty bytes out of you: bits are falling off you all the time. You have only a short time to reach help before the final Reset button in the sky is pressed.

There are four fences between you and your Resistance friends. (If you can once reach the Resistance, you will be Ohm and dry.)

Holes have been cut by the Resistance in the fences, but you do not know where they are. Meanwhile, the Hardwehr are raking the area with searchlights and machine-gun fire. If you get caught in the beam, you are done for — but you depend on the light to spot the holes in the fences. Your only chance is to jump into one of the round pits scattered around the terrain. If you are in one of them, the searchlight cannot pick you out.

You stumble, crouching, on your way — helped by the keyboard cursors . . .

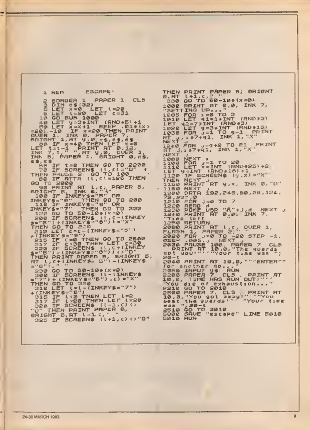
Notes

The game is in the form of a loop between lines 40 and 330. For half the time, the 'searchlight' (line 50 3) is on; for the rest of the time (line 60 3) it is off. The loop cycles 40 times in this period, at each cycle sampling the keyboard (Lines 100 110, etc) for the player-symbol's moves, made at line 90. Blotting out of previous positions is done at lines 220, 320, 325.

Every 40 cycles, when X=0, the loop jumps back to line 40, which sets up a new "searchlight" position. This is coded in lines 120, 230 and 330.

Jumping into holes and stopping movement through the fence is done using *Screen$* at those lines where the symbols appear. The loop has to be as short as possible, so that the game does not become hopelessly slow.

Lines 1000 to 2510 look after initialising and final results. The little man is set up, as a UDG in Lines 1200 and 1230. ■



```
   1 REM      ESCAPE!
   2 BORDER 1  PAPER 1  CLS
   3 DIM e$(32)
   5 LET x=0  LET t=20
   6 LET l=20  LET c=31
  10 GO SUB 1000
  40 LET y=3*INT (RND*6)+1
  50 LET x=x+1  BEEP .01*(x>
=20),-10  IF x=20 THEN PRINT
OVER 1, INK 0, PAPER 7,
BRIGHT 1,AT y,0 e$,e$,e$
  60 IF x=40 THEN LET x=0
LET t=t-1  PRINT AT 0,12,
INK 7,t," ",AT y,0, OVER 1,
INK 0, PAPER 1, BRIGHT 0,e$,
e$,e$
  65 IF t=0 THEN GO TO 2200
  70 IF SCREEN$ (l,c)="O"
THEN PAUSE 2  GO TO 100
  80 IF ATTR (l,c)=126 THEN
GO TO 2000
  90 PRINT AT l,c, PAPER 8,
BRIGHT 8, INK 8,"A"
 100 IF INKEY$="5" OR
INKEY$="8"  THEN GO TO 200
 110 IF INKEY$="6" OR
INKEY$="7"  THEN GO TO 300
 120 GO TO 50-10*(x=0)
 200 IF SCREEN$ (l,c-(INKEY
$="5")+(INKEY$="8"))="X"
THEN GO TO 220
 210 LET c=c-(INKEY$="5")
+(INKEY$="8")
 215 IF c=0 THEN GO TO 2600
 217 IF c>30 THEN LET c=30
 220 IF SCREEN$ (l,c+(INKEY
$="5")-(INKEY$="8"))<>"O"
THEN PRINT PAPER 8, BRIGHT 8,
AT l,c+(INKEY$="5")-(INKEY$
="8")," "
 230 GO TO 50-10*(x=0)
 300 IF SCREEN$ (l-(INKEY$
="7")+(INKEY$="6"),c)="X"
THEN GO TO 320
 310 LET l=l-(INKEY$="7")
+(INKEY$="6")
 315 IF l<2 THEN LET l=2
 317 IF l>20 THEN LET l=20
 320 IF SCREEN$ (l-1,c)<>
"O" THEN PRINT PAPER 8,
BRIGHT 8,AT l-1,c," "
 325 IF SCREEN$ (l+1,c)<>"O"
THEN PRINT PAPER 8; BRIGHT
8,AT l+1,c," "
 330 GO TO 60-10*(x=0)
1000 PRINT AT 0,0, INK 7,
"SETTING UP..."
1005 FOR i=0 TO 3
1010 LET q1=1+INT (RND*3)
LET q2=7*INT (RND*3)
1020 LET g=3+INT (RND*15)
1030 FOR j=1 TO g-1  PRINT
AT j,i*7+q1, INK 1,"X"
NEXT j
1040 FOR j=g+2 TO 21  PRINT
AT j,i*7+q1, INK 1,"X"
NEXT j
1080 NEXT i
1100 FOR j=1 TO 20
1110 LET x=INT (RND*25)+2
LET y=INT (RND*18)+1
1120 IF SCREEN$ (y,x)="X"
THEN NEXT j
1150 PRINT AT y,x, INK 0,"O"
1160 NEXT j
1200 DATA 192,240,60,28,124,
72,207,0
1210 FOR j=0 TO 7
1220 READ d
1230 POKE USR "A"+j,d  NEXT j
1240 PRINT AT 0,0, INK 7.
"Time left      "
1250 RETURN
2000 PRINT AT l,c, OVER 1,
FLASH 1, PAPER 2," "
2020 FOR j=0 TO -20 STEP -1.
BEEP .005,j  NEXT j
2030 PAUSE 100. PAPER 7  CLS
 PRINT AT 10,0,"The guards
got you!"''"Your time was ";
20-t
2040 PRINT AT 18,0,"""ENTER""
for another go..."
2050 INPUT y$  RUN
2200 PAPER 7  CLS . PRINT AT
10,0, TIME HAS RUN OUT!"''
"You die of exhaustion..."
2210 GO TO 2010
2500 PAPER 7. CLS   PRINT AT
10,0,"You got away!"''"You
beat the guards!"' "Your time
was ",20-t
2510 GO TO 2010
5000 SAVE "escape" LINE 5010
5010 RUN
```

House of the rising Psion

***David Kelly** talks to Psion's managing director, David Potter.*

Last week Psion announced the sale of its millionth cassette tape. Not bad for a company formed less than three years ago — with an annual turnover that is now more than £5m.

Yet Psion keeps a fairly low profile — it does not court publicity and its exclusive agreement with Uncle Clive has meant the Sinclair banner dominates the packaging of their cassettes.

Reformed academic David Potter started the company up from scratch in 1980. Previously a lecturer in Microcomputer Applications at the University College of Los Angeles and Imperial College, London, David — now in his late thirties — was drawn by the energy of a new industry. "I think it is hugely exciting — computers used to be locked away for only an elite to understand — now everyone will have one. I think it is tremendously rewarding to be involved in that process and I thought it was about time I got my hands dirty!

Psion originally produced some material for the Acorn Atom. Then came the first Sinclair programs. We did quite a lot of stuff in the early stages for the ZX81 which was marketed mainly abroad — in Australia, France, Israel and Canada.

Psion also has a sales and distribution arm in Southern Africa. "We are the second biggest microcomputer distributor in South Africa, Zimbabwe and Botswana.

'Psion is still a very young company. Several students came with me from Imperial — and on the software side we now have a very powerful team using facilities which I believe are second to none.

The company now employs 16 full-time programmers — many of whom have outstanding academic careers behind them — three PhDs and five with first class honours degrees. Their specialist areas vary considerably: graphics, programming, electronics, data-storage.

"I think, in contrast to some other software houses, we are a highly professional team — we don't have their schisms!"

It is certainly true that few companies can boast the programming facilities offered at Psion. The first floor of Psion's headquarters — a smallish mews warehouse just off Baker Street — is dominated by the minicomputer system used for programming. The whirr of its air-conditioning lends the white-walled room the feel of a laboratory.

'I'm sad to say we don't develop software on micros — we use our Vax system." This — a 32-bit Digital Vax II/750 costing over £130,000 — is a 10-terminal time-sharing system with 121 megabyte hard disc storage and has been the most significant investment for Psion.

'On it we have specialised software that can simulate most of the common microprocessors. We can even simulate the working of a chip while it is still in the designer's mind and develop software for a new machine before its launch!

"We can target the machine-code written on the Vax down into the microcomputer. In the States Microsoft has this type of facility but I don't know of anyone in the UK who does.

'To assemble our *Flight Simulation* program on the Spectrum in machine-code takes about an hour. To do the same thing on the Vax takes less than a minute." When the code is loaded from the Vax to the Spectrum and run it is controlled from the Vax. "You can actually interrupt the Spectrum from the Vax keyboard and reload from the Spectrum into the Vax to find out what is going wrong. In this way the program is very far advanced before it is tested in the actual environment of the Spectrum.

'With the Vax system we are not restricted to writing in machine-code either. Where speed is not essential in the running of the program, we can write in a high-level language. We like *C* for example. The code in *C* is then portable — whatever code we write can be applied to machines with different processors: Z80, 6502 or 68000 even.

As a result of the early ZX81 material which Psion produced and was marketed by Sinclair, the two companies now enjoy a close relationship.

"Programming is in our blood — we are code junkies!"

"We have an exclusive agreement with Sinclair — it has sole marketing rights to our ZX software. Psion has a good and strong relationship with Sinclair. We have gone out of our way to produce a very wide range of software both for the ZX81 and the Spectrum, at the soonest possible moment. This has helped Sinclair by providing an early software base and it helps Psion by giving us a wide distribution.

The first Spectrum for software development went to Psion. "We were working at the earliest stages on the Spectrum — we had a huge amount to do." The first thing Psion wrote was the *Horizons* welcome tape. "That was at Sinclair's suggestion and it is one program we feel very pleased about.

"Apart from *Horizons* we have to produce a whole range of 11 or 12 items — games and utilities — within a very short space of time. At that time we didn't have the programming capacity, so we suggested to Melbourne House that they might like to participate. At that time we conceived a game which turned out to be



Hungry Horace and Melbourne House implemented the code in consultation with us.

Psion does not use any freelance programmers — all the software is developed in-house. We are a wildly enthusiastic company, says David. Nobody has ever left Psion — programming is in our blood — we are code junkies!

Software development is carried out in groups — typically three with a project leader. The detailed design — as far as possible *a priori* for each product — is conceived by the more experienced members of the company. A team is then selected for the actual programming. "As the program evolves, the project leader oversees the detailed execution of the software. Everyone inside the company gets a chance to see it and put in their ideas. Nobody is writing in a void — the feedback is essential.

'One of the things we are always trying to do is to extend the limits of the software as the hardware develops. When the Spectrum came along it was suddenly possible to implement ideas previously considered unworkable — *Vu-3D* or the Spectrum version of *Flight Simulation* could not have been contemplated on the ZX81.

"That is how we get a lot of our ideas — the approach is: Here is the hardware. Now, what can we do on it that would have seemed crazy before?"

Psion has recently concluded a licensing agreement with Spears to produce a home computer version of *Scrabble*. 'That's an example of the sort of project that wouldn't have been possible on the ZX81. For a start the program needs a dictionary of 10 000 words. The challenge is how to get 50,000 letters into a 48K Spectrum — not to mention the board display on the screen and the complex logic needed for the move generators.

"Yet our *Scrabble* version is going to be better than the Apple version — even with its disc storage — and have a dictionary substantially greater than 10 000 words.

"When we come up with an idea there are two important questions. What ingredients, from the user's point of view, make it an exciting game — reactivity, 3-dimensionality, strategy — and what is possible within the constraints of the hardware?

"*Space Invaders* is a good early example of reaching the best compromise — it is exciting to play and technically the game was easy to program because the invaders move in rows in a regular fashion. Random motion is much more difficult — and a Horace-type game is even more so.

"That the hardware is still developing at such a fast rate — and therefore that our products become out of date — is good. I think it would be very boring if the hardware stopped moving forward because on the software side it would no longer be possible to be creative and innovative.

"We have a whole range of Horace games"

"It will be very interesting to see where software will go in the future. My own view is that there are a whole range of game-types which in turn verge on education and on business — adventure games and simulations. And things from artificial intelligence which we can learn are very important — programs which understand English and have a dialogue with the user. In house we have a program called *The Psychiatrist* based on Chomsky's idea that syntax is more important than semantics.

"All it does is ask you questions based on what you have already told it. It seems remarkably intelligent — of course it's a trick, but it tells us a lot. There is a whole range of artificial intelligence material that we can use in games.

"Reactive, strategic adventure games — combining the basic features of adventure games in real time with graphics. Having to think on your feet. This kind of thing is only just becoming possible.

"Also it is a step along a long road that *Horace* has taken — interactive cartoons — Mickey Mouse where you are *actually* Mickey. We have a whole range of *Horace* games coming along. He has a chance of turning into quite an important character. I want to see him on a billboard somewhere — up in lights — or maybe on the milk bottle brought in to breakfast by the kids.

"The earliest computer games were a development from the arcades — with a big element of killing stuff from outer space. That has a place but I would be horrified to see that as a main stream. I don't think killing is a creative area! And less enduring too. People go on wanting to play a game like *Flight Simulation* because it has some subtlety. The book equivalent of a space-zap game would be like a Mickey Spillane novel — pretty hard to read more than once. We have also shown that there is a big market for applications software — *Vu-File* or *Vu-Calc*. *Vu-File* is the top US seller for the TS1000.

"It is the challenge of doing something well I suppose which is attractive. Without being pompous about it, we are an expanding company, we are getting people working and we export a huge amount. We are part — and pleased to be part — of one of the few industries that is growing.

"Shortly we will sell versions of our *Vu File* and *Vu-Calc* programs for the BBC machine. And a very major part of our effort at the moment is work on an integrated suite of business applications packages. Also we will continue to push the Spectrum.

"We have grown up in a modest span of time and we suffer growing pains like anybody else. We have a lot to do and we must pick and choose our projects. We would dearly like to do material for the Dragon. But it is better to do just a few things really well.

"Even in the last nine months, everything has moved on significantly. You need a lot of capital — the Vax, for example — and a very high degree of skill at every level of the company.

"Sinclair, for all the criticisms, has done well. He is the dominant force in Britain. In the US there are four companies — Timex/Sinclair, Atari, Commodore and Texas Instruments — all pretty substantial organisations. There is a real fight developing and it looks now like Texas has a policy of selling at a small loss to gain a market share.

"Psion has a close relationship with Timex. Our TS1000 software has done extremely well over there. Our impression was that the TS2000 was coming out in April — but now it looks as if it has been delayed until the middle of the year — and we will lose a lot of the market. The Spectrum is a tremendous machine — but it will not always be so. In a couple of years it will be superseded.

"One of the great strengths of Sinclair has been its ability to move very rapidly — and this is why the likes of Sinclair and Apple have been the forerunners and not Timex and IBM. They cannot move fast enough.

"For ourselves, we intend to become the Microsoft of Europe — that is the way we want to proceed. We intend to be in there producing good programs and fights for a long period of time yet.

"As part of that commitment, we have just set up a new company — Psion Processors — which will develop dedicated software for specific hardware applications. As hardware becomes cheaper and cheaper it makes sense to have machines for dedicated purposes. I think we will see big changes in the next five to six years.

"Our whole approach is a disciplined one but we are still small so we don't have bureaucracies, hierarchies or that sort of nonsense. Everyone has a sense of involvement and works hard. But there is the freedom to work at any time — people can be in here working at two in the morning — and sometimes they are!

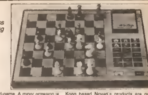
"We will stop being interesting as a company if we lose that good feeling — that sense of involvement. Frankly, for myself, I have never had so much fun in my life before.

"When I did my PhD, I used an English Electric KDF9 computer which took up the whole room and had to be protected from dust, temperature variations and humidity changes. Now the 48K Spectrum is very close in power to it. You could say I've been through the mill!

"I don't write much of the code anymore — and I miss it. I am very knowledgable of both hardware and software — but not with that honed edge. That worries me. My worth will disappear when I no longer realise just what it is possible to achieve. If I lose that I'm not much use." ■

Check-mate!

***John White** looks at some of the latest chess machines and compares them with the "Big Three"*



In March 1982, the Silica Chess Computer Symposium pitted two teams of human players against the best chess computers that were then available the *Champion Sensory Challenger* the *Chess Champion Mk V* — Philidor program — and the *Great Game Machine* with Morphy, Grunfeld and Capablanca cartridges The *Champion Challenger* performed best, with a British Chess Federation grading of 133 the others obtaining a highly respectable grade of 122-124 An *Elite Challenger* also made a brief appearance — it did not play enough games for a grading, but scored an amazing 70 per cent success rate in five games

Since last March, a number of new chess machines have been launched to challange the dominance at the top end of the market of the 'Big Three machines for playing strength

The *Mephisto II* is manufactured by the German company Hegener and Glaser and is a continuation of the older model I *Mephisto* was launched in a blaze of publicity suggesting that it was the strongest machine on the market a claim essentially based on games between itself and other computers The basic price is only £200, although it is also possible to plug the machine into an electronic sensor board for an additional £250

The *Mephisto* unit is well constructed and offers all the normal facilities that one expects these days including a book opening library In addition, the machine will randomly select between moves of roughly equal merit, has a quiet beep tone and permits memory storage of positions, using battery or mains operation There are seven normal playing levels which take from a few seconds to 20 minutes a deep search for postal chess and a special mate-finder which can find mates in up to five moves

The program "thinks while its opponent is making his move, and can provide hints for human players *Mephisto* is undoubtedly one of the new generation of 'superfast' chess computers It searches to a depth of four half moves at tournament speeds searching deeper into some lines and in the end-game A minor omission is the 'chopper mechanism which ensures that automatic moves — ie, where only one legal move exists — are made at once *Mephisto* examines all the consequences of its one move before making it

Mephisto contains 280 opening lines This compares with the 490 lines in the latest Grunfeld opening cartridge used with the *Morphy* program or the nominal 64 opening lines of the *Champion Challenger* the actual number of lines depends on how you count the sub-variations *Mephisto's* openings can be selected in a somewhat tedious manner (it is easier with Grunfeld or CSC) and the opening lines are mostly traditional ones rather than the odd lines found for example in the *Champion Mk V* Overall the opening library is good and the sensor board adds a further 40 lines

Mephisto's tactical play is very strong It passes my standard test positions with flying colours with one of the best scores I have yet recorded These tests measure the effectiveness of the operating system and the speed and depth to which the program looks in mid and end-games

Mephisto's mid-game positional play is somewhat suspect, probably the evaluation function needs improvement it made some weak moves at tournament speeds including some inane king moves *Mephisto* is also prone to suffering from isolated doubled pawns, a severe strategic weakness

Mephisto is unusual in preferring bishops to knights — Morphy is the only other major program with this preference The others prefer to swap their bishops for enemy knights in the case of the *Challenger* generally at the first opportunity

Mephisto generally performs pretty well in the end game being a little better then the Morphy end-game and a little worse than Capablanca *Mephisto* cannot win the standard king bishop knight versus king ending as far as I know the *Champion Mk V* is the only program which can

In tournaments against humans under the standard conditions of the Silica Chess Computer Symposium *Mephisto* has done much less well then the Big Three But it can still be recommended as a very strong program at a moderate price

After various tribulations, the Hong Kong based Novag's products are now distributed in the UK by Studio Ann Carlton who also handle the *Great Game Machine* The present Novag range consists of *Microchess* a small portable machine the *Sensory IV* an 8K program very similar to the Sci Sys *Sensor Chess* and the top of the range *Savant*

The *Savant* uses a 24K program developed from the American David Kittinger's famous *Mychess* program with 4K of Ram for calculations The central CPU is a Z80A running at 6MHz faster than any of its competitors

A very important feature is the unit's large touch-sensitive LCD chess board All the pieces are displayed under a piece of clear plastic Touching the location of any piece and a second square will move the piece to that square

On the sample I tested this worked very well but I noticed two disadvantages First, the human has to hunch over the display to avoid parallax problems in seeing the pieces Secondly light shining in from a window may obscure part of the screen

The *Savant* offers all the standard features expected of a modern chess computer It can search to a depth of 14 ply at the highest levels and gives good results playing at normal tournament speeds There are 10 levels of play with random selection between moves of equal merit

"Thinks" while it is waiting

The *Savant* thinks while it is waiting for its opponent to move and can give hints as to what you should do Other features include a *Cmos* memory which will store moves without a power supply for up to three months — the *Savant* can demonstrate 'Classic Games played by grandmasters similar to the Great Games offered by the *Champion Challenger*

The book opening library is quite good with 850 moves — although not in the same class as its main competitors — and the program will find forced mates in up to seven moves Optional extras include a chess printer for the moves and a quartz chess clock which will also serve to monitor play between two humans

The standard of play is very good but

like *Mephisto II*, not quite in the same class as the 'Big Three' In fact the *Savant* is also a little weaker than *Mephisto* and is therefore the weakest of the 'First Division' chess computers in the end-game, the *Savant* permits pawn promotion to a knight as well as to a queen, unlike most of its competitors

At £400 it is difficult to recommend the *Savant* unless you are keen on the touch sensitive LCD board Readers should note that an earlier and weaker version of the *Mychess* program is also available for the Tandy and Apple microcomputers.

Sci-Sys W's *Sensor Chess* — £90 — consists of a 4K program in a replaceable Rom module fitted into a sensory board with a fast 6502 microprocessor Designed by the American Master Julio Kaplan, it offers eight levels of play one of which solves mate in up to four move problems The top normal playing level is level five, which takes an average of 2 3 minutes per move although captures tend to be much faster It is very likely that the program uses a different operating system to that employed by the other programs, only sketchily evaluating the higher levels after a detailed evaluation at the lowest level

Pawn promotion can be to any piece and the machine recognises draws under the three-move repetition and 50 move rules Most of the normal chess computer facilities are offered but a timer is lacking, as is a move counter an indication of the move the machine is thinking about and the ability to think on the opponent's time

The basic module has no book openings but will choose randomly between a few different opening moves The module is rather a good one and its end-game play although not outstanding, is superior to that of many similar-priced competitors The advance of pawns is quite accurate throughout the game and the king becomes very active at the end

The play can be improved by purchase of replacement modules At present these include *Hypermodern* and *Classical* — £20 each — and *Strong Play* — £15 The first two contribute a variety of shallow book openings and slightly alter the style of the play of the basic module, but otherwise there is little difference

Strong Play however, is a 8K program which contributes a series of book openings and greatly improves the end-game play This module is a marked improvement over the other three and represents the strongest play presently available from a machine up to £120 It has been claimed to be as strong as the Morphy program standing alone in the Morphy Encore on the dubious basis of games between them This claim is not substantiated by its performance in my tests and by play against me, Morphy is markedly stronger

During play, *Strong Play* is somewhat prone to suffering from doubled pawns and resembles Morphy in its preference for bishops over knights It cannot win the standard king-bishop-knight versus king ending but deals comfortably with a king-rook versus king ending

The sensor board of *Sensor Chess* is quite sensitive but slow to react Overall, *Sensor Chess* with *Strong Play* module must be accounted very good value indeed at £105. A good "second division" program

The *Elite Challenger* is a magnificent Fidelity-Spracklen (Sargon-derived) program, very similar to the *Champion Challenger* but running at twice the speed with a 4 MHz 6502B CPU Physically the machine also closely resembles the *Champion*, except for the "*Elite*" logo, a few more book openings and a slightly improved program The *Elite* scored a 70 percent success rate in the Silica Symposium against human players graded at BCF 110-160 But — the price at £660 is ridiculous

Lacks the infamous Fidelity voice

The *Elite* was always in limited supply, and is now set to be overtaken by Fidelity's new *Prestige Challenger* at £660 which employs the superb auto response board — a hand-crafted wood unit — with an updated *Elite* program The *Prestige* uses a 6502C microprocessor I do not have space for all its features, but they are very comprehensive and the program is modular so that it can be improved in the future An interesting feature of the new *Prestige* program is its dynamic reassessment of the relative values of knight and bishop as the game proceeds

The existence of Fidelity's *Challenger 9* makes the price of the *Elite* even more absurd At only some £160, a program virtually indistinguishable from the *Elite's* has been coupled with a sensory board and a 6502 CPU to give the *Challenger 9* This machine plays much the same as the *Champion Challenger*, with a slightly improved program and with a good book opening library, which can be increased by inserting extra plug-in modules But it lacks the infamous Fidelity voice found on the more expensive models

The *Challenger 9* undoubtedly offers the best strength play for the least price of any machine presently on the market It has no real weaknesses Potential buyers should note that *Challenger* programs tend to be the most obviously machine-like of chess programs as well as the strongest In a quiet position, the program will often just move a piece backwards and forwards However their tactical play is second to none and the end game play of all Spracklen-designed *Challenger* programs is outstanding

Conclusions

★ The *Prestige Challenger* is the strongest on the market. At £860 it can only be recommended to millionaire grandmasters

★ The *Champion Sensory Challenger* is still one of the best machines available At £330 the purchaser gets a sensory board and the Fidelity Voice

★ The *Challenger 9* is outstanding value at £160 It lacks the voice of the *Champion* and also has no chess clock

★ Sci-Sys W's *Chess Champion Mk V* — £280 — remains a very strong machine, and a new *Mk VI* program is available for existing purchasers on a replaceable cartridge

★ The *Great Game Machine* with upgraded opening and end-game modules is still one of the top machines but rather pricey at around £470

★ The *Mephisto II* — £160 — is good value at the price, but weaker than the machines above

★ The Novag *Savant* — £400 — has a touch move board display but is rather expensive for the standard of play

★ Sci-Sys W's *Sensor Chess* with *Strong Play* module is excellent value at only £105



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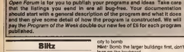
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Blitz

on Spectrum

The object of the game is to bomb the buildings by pressing any key to land safely. If you do this you are given another city to bomb.

Hint: Bomb the larger buildings first, don't lean on the keyboard

Variables

u–If bomb is dropped u=1 if no u=0
s–Score hs–High Score
t,r–Line and column of plane
c,d–Line and column of bomb
j–no of parts of a building destroyed by a bomb

Program notes

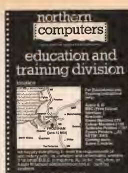
20 210 Main program loop prints plane and bomb
1001 1080 Prints random height buildings
2000-2060 Moves bomb
3000-3010 When plane crashes prints flashing plane
5000 5040 Prints instructions
6000-6000 Prints landed plane
6100 9040 Sets up user definable graphics
Lines 30 3000 6000 user graphics a,b c for plane
6020 6040 user graphics m and n
50 user graphic h
1030 user graphic h

```
Spec Blitz © Peter Holt
   1 PAPER 0  INK 1  BORDER 0  L
ET u=0  LET s=0  LET hs=0
   2 GO TO 5000
   5 GO SUB 1000
   6 LET j=0
  20 FOR t=1 TO 20  FOR r=1 TO 2
9
  21 IF u<>1 THEN LET c=t+1  LET
 d=r
  25 PRINT AT 0,1; INK 0; "SCORE
 ";s,TAB 16,"HIGH SCORE ";hs
  27 IF ATTR (t,r+2)<>41 OR ATTR
 (t,r+1)<>41 THEN GO TO 3000
  30 PRINT AT t,r-1;" "
  31 BEEP .003,0
  32 IF u<>0 AND c<>21 THEN PRIN
T AT c,d;" "
  35 IF u=1 THEN LET c=c+1
  37 IF c=21 THEN LET u=0
  38 IF c=21 THEN LET j=0
  40 IF c<>21 AND t<>20 AND INKE
Y$<>"" THEN LET u=1
  46 IF u<>0 AND c<>21 AND ATTR
(c,d)<>41 THEN GO SUB 2000
  60 IF u=1 THEN PRINT AT c,d; I
NK 2;" "
 200 NEXT r
 210 PRINT AT t,29;"   "  NEXT t
 220 GO TO 6000
1000 GO SUB 7000
1001 PAPER 5  INK 1  BORDER 5
1002 CLS
1003 PRINT AT 21,0; PAPER 5;'
1010 FOR i=3 TO 29
1020 FOR e=20-INT (RND*8) TO 20
1030 PRINT AT e,i; PAPER 5; INK
 ;" "
1040 NEXT e
1050 NEXT i
1060 RETURN
2000 LET j=j+1
2010 IF j>(3+INT (RND*3)) THEN L
ET j=0
2015 IF j=0 THEN LET u=0
2020 IF j=0 THEN RETURN
2040 LET s=s+1
2050 RETURN
3000 PRINT AT t,r-1; FLASH 1;" "
3010 BEEP 5,2
3020 GO TO 5000
5000 PAPER 7  INK 1  BORDER 7
5010 CLS
5015 PRINT AT 19,7;"YOUR SCORE ";
s
5017 IF s>hs THEN PRINT '"
A NEW HIGH SCORE"
5018 IF s>hs THEN LET hs=s
5019 LET s=0  LET u=0
5020 PRINT AT 0,10;"B L I T Z",
INK 2,TAB 10;"---------"
5030 PRINT ,,,,,, INK 2 'You mus
t bomb the city to land
           Press a
ny key to drop a bomb.
           If you
hit one of the buildings
           you wil
l be killed instantly !!"
5032 PRINT ' ' INK 1'' PRESS A
KEY TO PLAY BLITZ "
5035 IF INKEY$="" THEN GO TO 503
5
5040 GO TO 5
6000 PRINT AT 20,27 "* "
6010 FOR q=1 TO 10
6020 PRINT AT 20,27,"*"
6030 PAUSE 40
6040 PRINT AT 20,27,"*"
6050 PAUSE 30
6060 NEXT q
6100 PAPER 7  INK 1  BORDER 7
6110 CLS
6120 PRINT '''"YOUR SCORE IS ";
s''''"  PRESS A KEY TO PLAY BL
ITZ"
6130 IF INKEY$="" THEN GO TO 613
0
6140 GO TO 5
7000 FOR y=0 TO 7
7010 READ e  POKE USR "h"+y,e  N
EXT y
7020 FOR y=0 TO 7
7030 READ e  POKE USR "e"+y,e  N
EXT y
7040 FOR t=0 TO 23
7045 READ e  POKE USR "a"+t,e  N
EXT t
7050 FOR t=0 TO 13
7060 READ e  POKE USR "e"+t,e  N
EXT t
7099 RESTORE
7100 RETURN
9000 DATA BIN 01111111,BIN 01001
001,BIN 01001001,BIN 01111111,BI
N 01111111,BIN 01001001,BIN 0100
1001,BIN 01111111
9010 DATA BIN 01111110,BIN 01111
110,BIN 00011000,BIN 01111110,BI
N 01111110,BIN 01111110,BIN 0111
1110,BIN 00111100
9020 DATA 12+16,14+16,10+16,18+1
6,15+16,15+16,4,8,15,2,31,255,25
5,255,16,127,252,5,157,255,255,2
53,129,224
9040 DATA 18,56,18,254,16,40,66,
66,16,186,84,56,16,40,68,65
```

SCORE 0   HIGH SCORE 0



Blitz
by P Holt



northern
computers
education and training division
Fylde
Preston
Liverpool
Warrington
FRODSHAM
(junc.12 M56)
Chester
Wrexham
The Potteries

Meteor

on Ace

You are in a Space Ship where you have accidentally plunged into a meteor storm and as the Space Ship Commander you have to navigate through the storm

The ship can withstand the impact of two meteorites and is destroyed by the third. A score is then displayed on the screen with random beeps from the computer

The program can be run in fast or slow mode and the speed can be adjusted by altering the *Beep* in the world *Game*. The word *Point* can be useful in other programs requiring two numbers on the stack and replaces it by the ascii value of the character occupying that square

The program is started by entering the word *Game*. The spaceship is moved from side to side using the 5 and 8 keys. After completion of the game press *Break* to stop the *Bleeps*. To play again enter *Game*

If the program does not work and the ship does not move correctly, the error will be in the words Ship and Move. If the UFO's do not move up the screen, you will most probably have left the CRs off the end of the word UFO

The game requires a random number generator. A routine is included from the Ace manual. The words *Seed*, *Seedon*, *Rnd* and *Rand* are used

First set up the following characters

GR 8 * 11263 + DUP 8 + DO I C! -1 +LOOP
SHIP 48 124 84 124 254 186 146 0 1 GA
METEOR 28 62 127 255 255 254 124 56 2 GR

The program should be tested, saved and verified, then use *Forget Gr* to allow sufficient memory for the main program

```
: POINT AT 152388 @ C@ ;
: MOVE INKEY DUP 53 = IF x @ 1- x ! THEN 56 = IF x @ 1+ x ! THEN ;
: END 10 10 AT ." SCORE:"S @ . BEGIN 100 RND 20 + 50 BEEP 0 UNTIL ;
: SHIP 0 x @ POINT 2 = IF L @ 1- DUP L ! 0= IF END THEN 300 300
  BEEP 200 150 BEEP 250 150 BEEP 300 300 BEEP 400 700 BEEP CLS
  THEN 1 EMIT ;
: UFO 22 32 RND AT 2 EMIT CR CR ;
: SET 3 L ! 0 S ! 15 x ! CLS ;
: GAME SET BEGIN MOVE SHIP 1000 20 BEEP S @ 1+ S ! UFO 0 UNTIL ;

The following variables need to be initialised before typing in
the main program:-

15 VARIABLE X
 3 VARIABLE L
 0 VARIABLE S
```

Meteor
by G E Richards

Multiply

on Spectrum

This program calculates all the digits of large powers of two — up to 65535 for the 48K Spectrum and about 44500 for the 16K Spectrum

The digits are stored from memory location 26000 in groups of two, the last two being at 26000

The program first asks what power you want — this is then stored in locations 25996 and 25997. A machine code multiplication routine starting at 23760 is then called. When this is finished you are asked if you want to *Lprint* the result, *Print* the result or *Clear* the memories (this must always be done before a new calculation). If the last option is chosen the memories from 26000 to the number held in 25998 and 25999 are cleared, the program then starts again

Powers up to 9200 are done in less than five minutes and the largest known prime number +1+ in less than two hours

The machine code works by taking all the digits of the number held from locations 26000 in turn in groups of two doubling them and adding the carry from the previous result. Every time the number increases in size by another two digits an extra memory is allocated. When the whole number has been doubled the computer checks if the specified power has been reached, if not it doubles again

```
  1 REM ..............................
..................................
.........
  2 DATA 243,17,144,101,33,0,0,
229,35,34,144,101,6,0,33,143,101
,35,126,135,128,5,0,254,100,56,1
,214,100,229,6,1,237,82,225,56,
1,19,119,167,229,237,82,225,56,2
37,229,35,229,213,237,91,140,101
,237,82,209,56,211,237,83,140,10
1,225,251,201
  3 FOR i=23760 TO 23825: READ
k: POKE i,k: NEXT i
  4 INPUT "Power?",p: POKE 2599
7,INT (p/256): POKE 25996,p-256*
PEEK 25997: PRINT "2↑";p: RANDOM
IZE USR 23760: GO TO 10
  5 CLS : LET e=PEEK 25998+256*
PEEK 25999: PRINT "2↑";p,2*e-519
98-(PEEK e<10);" places"
  6 PRINT : FOR i=e TO 26000 ST
EP -1: LET a=PEEK i: IF a>=10 TH
EN PRINT a;: GO TO 8
  7 PRINT "0";a;
  8 IF PEEK 23689=3 AND PEEK 23
688=1 AND l=1 THEN COPY : CLS
  9 NEXT i: IF l=1 THEN COPY
 10 PRINT : PRINT : PRINT "Lea
/ Print / Print?"
 11 LET a$=INKEY$: IF INKEY$=""
 THEN GO TO 11
 12 LET l=(a$="l"): IF a$="p" O
R a$="l" THEN GO TO 5
 13 IF a$<>"c" THEN GO TO 11
 14 FOR i=26000 TO e: POKE i,0
: NEXT i: CLS : GO TO 4
org 23760
23760 F3            di
23761 11 90 65      ld de,26000
23764 21 00 00      ld hl,0
23767 E5            push hl
23768 23            inc hl
23769 22 90 65      ld (26000),hl
23772 06 00         ld b,0
B loop
23774 21 8F 65      ld hl,25999
S loop
23777 23            inc hl
23778 7E            ld a,(hl)
23779 87            add a,a
23780 80            add a,b
23781 06 00         ld b,0
23783 FE 64         cp 100
23785 38 05         jr c,Carry
23787 D6 64         sub 100
23789 E5            push hl

23790 06 01         ld b,1
23792 ED 52         sbc hl,de
23794 E1            pop hl
23795 38 01         jr c,Carry
23797 13            inc de
Carry
23798 77            ld (hl),a
23799 A7            and a
23800 E5            push hl
23801 ED 52         sbc hl,de
23803 E1            pop hl
23804 38 E3         jr c,S loop
23806 E1            pop hl
23807 23            inc hl
23808 E5            push hl
23809 D5            push de
23810 ED 5B 8C 65   ld de,(25996)
23814 ED 52         sbc hl,de
23816 D1            pop de
23817 38 D3         jr c,B loop

23819 ED 53 8E 65   ld (25998),de
23823 E1            pop hl
23824 FB            ei
23825 C9            ret
```

Multiply
by S Muth

Ovals

on BBC Micro

This program is for Model A or B

What the program does is draw ovals. When you run the program you are asked for the width of the oval using the graphics planning sheet on page 495 of the user guide then input the height. Ovals may be drawn on top of one another.

To clear the screen change 130 to *Goto 40* after you have drawn one oval.

```
10 REM ****CIRCLE/OVAL****
20 REM *********BY********
30 REM ****DAVID  DALE****
40 MODE 1
50 VDU 29,640;512;
60 INPUT A,B
70 MOVE COS1*(A/2),SIN1*(B/2)
80 FOR X=1 TO 133 STEP 6
90 DRAW COSX*(A/2),SINX*(B/2)
100 SOUND 1,-15,255,0.25
110 NEXT
120 VDU 30
130 GOTO 50
```

Ovals
by D Dale

Bomber

on Dragon 32

Bomber is, as its name suggests, a program in which you have to bomb some nuclear reactors and thus devastate the enemy territory.

The reactors are the white cup shaped forms at the bottom of the screen, and to successfully destroy them your bomb must hit the bottom of it, not the sides. The ascending figure at the top left of the screen is the time you have taken, and the constant figure is the time you are allowed.

Take it easy with your bombs (which you release by pressing the spacebar, your only control) as each one puts the timer on by 20 units. When you have successfully bombed two sites, everything (including the timer) speeds up. When all sites are fallen you resume your task but with less time to complete it.

Sound easy? It's not. There is a cloud of pink radioactive dust hovering above the sites and if your bomb strikes it, it is rendered useless. You must aim for the break in the cloud for your bomb to get through.

Your score is calculated according to how long you have left in each screen. So hurry — and good shooting!

Program notes

10-110 SET UP VARIABLES
120-220 DRAW SCREEN
230-460 MOVEMENT LOOP
470-500 END OF SCREEN ROUTINE
510-630 END OF GAME ROUTINE

Variables

DD = Screen number
FS = Final score
SC = Number of bases intact
LIMIT = Time allowed for screen
TT = Timer
AERO = Aeroplane's position
CHECK = Check if a bomb is visible
BOMB = Bomb's position
BARR = Position of break in cloud barrier

The variables have been given easy to spot names so that those interested can disect the program. Note the little trick used in line 210 where I have filled the sites with *Chr$* (144) — a black square, the same as the rest of the screen but very distinct to the computer. All you need to do then is tell your Dragon to look for it, as I did in line 310. I would advise you to remember this little trick as it can come in very useful.

PROGRAM OF THE WEEK

```
0 '***BOMBER***(C).A.DOWEY***
15 '*POPULAR COMPUTING WEEKLY*
20 DD=1
30 FS=0
40 SC=5
50 LIMIT=2250-250*DD
60 TT=0
70 POKE65494,0
80 CLS0
90 A=1024
100 AERO=1024+32
110 BARR=1024+252
120 FORI=224 TO 255
130 POKEA+I,239
140 NEXTI
150 FORI=454 TO 473 STEP2
160 POKEA+I,207
170 NEXTI
180 FORI=0TO2
190 FORJ=486 TO 502 STEP 4
200 POKEA+I+J,207
210 POKE A+J-31,144
220 NEXTJ,I
230 '**
240 TT=TT+I
250 IF TT>2250-250*DD THEN 510
260 PRINT@0,TT;"/";2250-250*DD;
270 IF CHECK=0 AND INKEY$=CHR$(32) THEN BOMB=AERO
    +32:CHECK=1:TT=TT+20
280 IF CHECK=1 THEN POKE BOMB,128:BOMB=BOMB+32
290 IF BOMB>A+511 THEN CHECK=0
300 IF PEEK(BOMB)<>128 AND PEEK(BOMB)<>144  THEN
    CHECK=0:PLAY"T100O1CCCCCC":BOMB=A+511
310 IF PEEK(BOMB)=144 THEN CHECK=0 :POKE BOMB,223:
    BOMB=A+511:SC=SC-1:PLAY"T100O3CDEFGABAGFEDC"
320 IF SC=0 THEN PRINT@224,"YOU DID IT IN ";TT;
    "TIME UNITS":SCREEN0,1:GOTO470
330 IF SC<4 THEN POKE65495,0
340 IF CHECK=1 THEN POKE BOMB,210
350 AERO=AERO+1
360 BARR=BARR-1
370 IF AERO>A+62 THEN POKEAERO-1,128:POKEAERO,
    128:POKEAERO-3,128:POKEAERO-2,128: AERO=A+34
380 IF BARR<228+A THEN POKEBARR+1,239:POKEBARR+2,
    239:POKEBARR+3,239:POKEBARR+4,2
39: BARR=BARR+23
390 POKE AERO-1,147
400 POKE AERO+1,147
410 POKEAERO-2,155
420 POKEAERO-3,128
430 POKE AERO,159
440 POKE BARR+4,239
450 POKE BARR,128:POKE BARR+1,128:POKE BARR+2,128
460 GOTO230
470 FS=LIMIT-TT+FS
480 DD=DD+1
490 FORYY=1TO2000:NEXTYY
500 GOTO40
510 PRINT@233,"GAME OVER";:SCREEN0,1
520 FORYY=1TO2000:NEXTYY
530 CLS0:PRINT@34,"YOU SCORED ";FS;" POINTS.";
540 IF FS>HS THEN HS=FS
530 IF HS=FS THENPRINT:INPUT"THATS THE HI-SCORE
    WHAT'S YOUR NAME?";
560 CLS0
570 PRINT@34,"YOUR SCORE- ";FS;
580 PRINT@98,"HI-SCORE-> ";HS;
590 PRINT@162,"BY ";NAME$;
600 PRINT@452,"PRESS A KEY TO PLAY";
610 SCREEN0,1
620 IF INKEY$="" THEN 620
630 GOTO20
```

Bomber
by Alison Dower

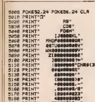
Map

on Vic20

This program allows the use of hi-resolution on the unexpanded Commodore Vic20. It uses the Vic's inbuilt facility for hi-res graphics.

The program will first draw a map (I hope everybody will recognise my country) and then will turn it in hi-resolution.

Will any British turn it to Great Britain? Just a bit of programming is necessary to do so. Good luck!



```
5000 POKE52,24 POKE36,24 CLR
5010 PRINT"J"
5020 PRINT"          AB"
5030 PRINT"          CDE"
5040 PRINT"         FGEH"
5050 PRINT"       IJ@@@@KL"
5060 PRINT"   MNOP@@@@@@@GR"
5070 PRINT"   @@TU@@@@@@@Y"
5080 PRINT"   WX@@@@@@@@@@Y"
5090 PRINT"    ZI@@@@@@@@@@"
5100 PRINT"      J@@@@@@@@?+"
5110 PRINT"      !@@@@@@@"CHR$(34)
5120 PRINT"      @@@@@@@@X"
5130 PRINT"       @@@@@@@'"
5140 PRINT"       (@@@@@@)@"
5150 PRINT"       +@@@@@@,-"
5160 PRINT"       .@@@@@@/0"
5170 PRINT"       1@@@@@@23"
5180 PRINT"       4@@@@@@@5"
5190 PRINT"      6@@@@?@@ ,"
5200 PRINT"       <=>@7-@"
5210 PRINT"         !--"
5220 D=8144
5230 DIM C(52)
5240 FOR K=0TO 52:READ C(K):NEXT
5250 FOR R=0TO60
5260 READ A$
5270 FOR L=0TO7
5280 K=ASC(MID$(A$,L+1,1))-64
5290 IF K>26THEN K=K-102
5300 POKED+8*R+L,C(K)
5310 NEXT NEXT
5320 POKE36869,254
5330 GOTO5330
5400 DATA0,1,3,7,11,12,13,14,15,18,26,27,31,
     35,63,64,71,95,96,111,120,124
5410 DATA127,128,140,142,143,144,150,159,
     160,176,190,192,194,198,199,204
5420 DATA203,224,228,230,238,230,236,240,
     243,244,248,252,253,254,255
5430 DATA "@@@@@@@@",AHLNNVVV,"@@@@WH"*@",
     VVVNNVVV,"@X !@@@@@","@@@@W! \\",@@A3CHLV
5440 DATA "V@@@@@@@"," |///| |@","-UTTUUUN",
     "@ABCA@A|","@W| @ ||@@","@@@@R\@@"
5450 DATA @@@@@@@A,@@@@@CCD,"@@@@@@W| ",LLNLL
     LLL,"/@@@@@@","@@|0 |OXX",3CHNCA3C
5460 DATA "|T-@@@@@","LZ\@@@@@","X@@@@@@@",
     @AH@ARAR,"@@@@@VVH","@\\\|||"
5470 DATA H3AAAA@A,"@@@NVHH","||\\\\\\\",HLJ
     33C@3,"||||!OOX","\O@@@@@@"
5480 DATA @@@@@@@@,D3CC33AA,'X@@@@\\!",A@@@@
     @@@,"@@VKE3P@","|WWXV|__",C3AIICHH
5490 DATA "||@@@@||",C33DDDFF," !@@@@@@@","@@
     @@WW|W",FFE@@HLL,"@||OOXOO",W@@@@@@@
5500 DATA LLNHLLLL,"O@@@@|||",@WWWW@@@,LLLLL
     LHN,"!!@@@@@@","@@@3- !OO","NNNVVVV@
5510 DATA "OXXX\\\|",@A3A@@@@,"@@@@@ !X@",'@@
     @~3@@@",'@@L-NHHA",'@@||OOOX'
5520 DATA W@@@@@@@,NCCCC3@@,"@@@@@VHN","@@@@
     @VL3","\\\\\\\\",A@@@@@@@,"~3@@@@@@"
5530 DATA 33@@@@@@,"@VVVVNN3","\\\\@W@@"
```

Map
by C Aubry

Cassette

on ZX81

A program for the ZX81, or Spectrum with printer, with 16K of memory.

The program makes use of the fact that the Sinclair printer's paper is just the right width to fit into an ordinary cassette holder. The program produces a sleeve to fit into a holder printed on witich are the main title, artist's name, and the song titles for both sides of the cassette. All inputted by prompts within the program.

The sleeves can be used either for sound cassettes or computer programs. In both cases a collection of cassettes looks much neater if the sleeves are printed in this way.

```
  1 REM SLEEVE PRINTER.
        P.HARLAND.
  2 CLS
  5 PRINT AT 11,0,'INPUT ARTIST
SIDE 1
 10 INPUT D$
 15 PRINT AT 11,16,"2'
 20 INPUT U$
 25 PRINT AT 11,0 "INPUT NUMBER
OF TITLES SIDE 1"
 30 INPUT SD
 35 PRINT AT 11,26, 2"
 40 INPUT ST
 45 LET Z=SD
 50 IF ST>SD THEN LET Z=ST
 51 IF Z>16 THEN LET Z=16
 55 PRINT AT 11,0, INPUT TITLES
ON SIDE 1
 60 DIM O$(Z,15)
 65 FOR F=1 TO SD
 70 INPUT O$(F)
 75 NEXT F
 76 PAUSE 80
 80 PRINT AT 11,21,"2"
 85 DIM T$(Z,15)
 86 FOR F=1 TO ST
 95 INPUT T$(F)
100 NEXT F
105 CLS
110 PRINT AT 11,0,'INPUT MAIN T
ITLE SIDE 1"
115 INPUT A$
120 PRINT AT 11,22,"2"
125 INPUT B$
130 LET T=2
135 GOSUB 250
140 LPRINT D$,U$
145 LPRINT "________________________"
150 LPRINT
155 FOR F=1 TO Z
160 LPRINT O$(F),T$(F)
165 NEXT F
170 LET T=18-Z
175 GOSUB 250
180 LPRINT 'SIDE 1)   ",A$
185 LPRINT
190 LPRINT "SIDE 2)   ",B$
200 LET T=12
205 GOSUB 250
210 CLS
215 PRINT AT 11,0, PRESS (N/L)
FOR NEXT SLEEVE
220 PAUSE 4E4
225 GOTO 1
250 FOR F=1 TO T
255 LPRINT
260 NEXT F
265 RETURN
```

Cassette
by P B Holland

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Library

on ZX81

This is a program for all those who (like myself) gratefully snap up machine code subroutine listings in magazines such as your own to incorporate in other programs. This program allows you to set up a library which will alphabetically list the routines available and allow you to sample them within the library program.

PCW includes a subroutine on how to draw boxes in its October 7th issue. To put this into your library, load the program, request *Add* and make an entry which reads: BOXES PCW 07 10 82 16514

Now input M/C and the ZX will ask you for a starting address for the hexloader. Input the address included under the entry above and enter the machine code in the usual way. When you next *View* the library, an entry of 16514 will draw the box.

Program notes

Lines 1-3 are to hold machine code as required.
Lines 10-240 are a standard bubble sort, modified by lines 250-390 which allow the original set of items to be increased on future occasions.
Lines 500-560 allow the 5 digit address forming part of the library listing to call the required subroutine.
Lines 1000-1110 form a standard hex-loader.

```
1 REM ...........
2 REM ...........
3 REM
```

These lines should contain as many full stops as you can bear to put in.

```
10 PRINT "TO SET UP A NEW FILE, INPUT
   ""S/U"""
11 PRINT "TO ADD FURTHER ITEMS, INPUT
   ""ADD"""
12 PRINT "TO VIEW CONTENTS, INPUT
   ""VIEW"""
13 INPUT Q$
14 IF Q$ = "S/U" THEN GOTO 18
15 IF Q$ = "ADD" THEN GOTO 250
16 IF Q$ = "VIEW" THEN GOTO 321
17 GOTO 13
18 STOP
19 INPUT X
20 CLS
22 PRINT X;" ITEMS"
25 LET J = 0
30 DIM A$(X,32)
40 FOR N = 1 TO X
50 INPUT A$(N)
60 PRINT A$(N)
70 NEXT N
100 FAST
120 CLS
160 FOR N = 2 TO X
170 IF A$(N - 1)>A$(N) THEN GOSUB 185
175 NEXT N
180 GOTO 200
185 LET Z$ = A$(N - 1)
190 LET A$(N - 1) = A$(N)
195 LET A$(N) = Z$
200 RETURN
205 FOR N = 2 TO X
210 IF A$(N - 1)>A$(N) THEN GOTO 160
215 NEXT N
220 SLOW
221 CLS
225 FOR N = 1 TO X
230 PRINT A$(N)
235 NEXT N
240 GOTO 500
250 INPUT Y
251 LET J = 1
260 PRINT Y;" MORE ITEMS"
265 DIM B$(X + Y,32)
270 FOR N = X + 1 TO X + Y
280 INPUT B$(N)
290 PRINT B$(N)
300 NEXT N
305 CLS
310 DIM C$(X + Y,32)
312 FOR N = 1 TO X
315 LET C$(N) = B$(N)
370 NEXT N
380 LET X = X + Y
381 DIM A$(X,32)
382 FOR N = 1 TO X
383 LET A$(N) = C$(N)
385 NEXT N
390 GOTO 195
500 PRINT AT 17,0;"TO ADD MORE ITEMS
   INPUT ""ADD"""
510 PRINT "TO SELECT ITEM INPUT 5 — DIGIT
   CODE"
515 PRINT "TO ENTER M/C CODE,
   INPUT ""M/C"""
520 INPUT Z$
530 IF Z$ = "ADD" THEN GOTO 250
540 IF Z$ = "M/C" THEN GOTO 1000
550 IF LEN Z$ = 5 THEN LET Z = VAL Z$
560 RAND USR Z
570 GOTO 500
580 STOP
1000 CLS
1010 IF J = 0 THEN LET K = 16514
1020 PRINT "START ADDRESS?(FIRST FREE
   BYTE = ";X;")"
1030 INPUT K
1040 LET I$ = ""
1050 IF I$ = "" THEN INPUT I$
1060 POKE K,16*CODE I$ + CODE I$(2) - 476
1070 PRINT AT 20,0;K;" ";I$(TO 2)
1080 K = X + 1
1090 SCROLL
1100 LET I$ = I$(3 TO)
1110 GOTO 1050
```

Library
by T Gale

Kaleidoscope

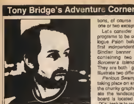
on Spectrum

The screen slowly fills with dots, meanwhile, the computer happily beeps away. The dots are randomly placed but it mirrors the dot opposite.

```
1 BORDER 1: PAPER 1:
  INK 7
2 PRINT FLASH 1; INK
  6; "[illegible]"
10 LET N=INT
  (RND*500)+1000
20 FOR A=1 TO N
30 LET V=INT (RND*
  160)
40 LET H=INT (RND
  *210)
50 LET RV=21+(100
  -V)
60 LET RH=31+(209
  -H)
65 BEEP .100,7
70 PLOT H,V
80 PLOT RH,V
85 BEEP .100,5
90 PLOT RH,RV
100 PLOT H,RV
110 NEXT A
120 PAUSE 9999
```

Kaleidoscope
by D Wallin

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Swamped!

Last week, we saw an adventure, written for the Atari machine that relied mostly on graphics for its appeal Now let s put the Sinclair ZX81 to the test, and see how it faces the challenge of graphic adventuring

While traditional adventure games rely mostly on the "logical" approach, "graphic" adventures require a more basic response from the player — a response from the reaction level rather than the intellectual This is not to say that they do not test the player s reasoning powers — they often do — but that reflexes are probably more important All generalisations, of course can be proved to have one or two exceptions

Let s consider a couple of the earliest programs to be offered by Sinclair s catalogue Psion before it became one of the first independents to come under the Sinclair banner produced a little tape containing two adventure programs *Sorcerer s Island* and *Perilous Swamp*. They are both graphic adventures and illustrate two different facets of the *genre*

Perilous Swamp is a pure board game, taking place on an unchanging map using the chunky graphics of the ZX81 to delineate the landscape Somewhere on the board is located the Princess and your "X's" task is to rescue her and bring her off the board at the Exit You may not move over the grey (swamp) squares.

The adventurer is catered for by the monsters that are met at every other move You must do battle with these — or bribe them into ignoring you! You will find that your Life Points ebb away each time you move The only way to get out of the swamp is by planning your moves well in advance to use the least number of steps Quickly played, and addictive

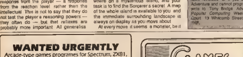
Sorcerer s Island is a much more complicated program You are put down somewhere on a mysterious island, and your task is to find the Sorcerer s secret A map of the whole island is available to you and the immediate surrounding landscape is always on display as you move about

At every move it seems a monster, be it Dragon or Balrog, confronts you. A decision must be made to fight run or bribe your way out of trouble Bribing is accomplished with the various bits of treasure you are always stumbling across Unfortunately, your staggering around the island is not unlimited — your Life Points as in *Perilous Swamp* decrease each time you move There is however a little hut to which you may return if you feel faint

Although the drawing of the map at each move is rather slow and neither program is of arcade quality nevertheless these are two very good programs and very good value for money at £4 75 for the pair Recommended as a change from the more cerebral adventures Another look at "graphic" adventures at a later date

In the meantime, keep your ideas views, likes and dislikes coming in — I hope to start giving them an airing soon Don t forget *Orc is just another name for AAARRRGGGHHH!*

This series of articles is designed for novice and experienced Adventurers alike Each week Tony Bridge will be looking at different Adventures and advising you on some of the problems and pitfalls you can expect to encounter So if you have an Adventure you want reviewed or if you are stuck in an Adventure and cannot progress any further, write to Tony Bridge Adventure Corner *Popular Computing Weekly* Hobhouse Court 19 Whitcomb Street London WC2 7HF.



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Through the looking glass

***Peter Donn** presents a short program to show how light passes through a convex lens*

INCREASE OBJECT DISTANCE
DECREASE OBJECT DISTANCE
INCREASE OBJECT HEIGHT
DECREASE OBJECT HEIGHT
DECREASE FOCAL LENGTH
INCREASE FOCAL LENGTH

This program is written for the BBC (any model) and demonstrates how light rays pass through a convex lens. The focal length, object distance from lens, image distance from lens, height of the object and height of the image are constantly displayed.

All these can be altered individually using the function keys (see diagram for details).

A ray diagram is also constantly displayed on the screen. The key to the display is as follows:

Red vertical line	=Object
Green vertical line	=Image
Yellow horizontal line	=Principal Axis
Yellow vertical line	=Convex lens

The remaining green lines represent selected light rays.

The program also shows the state of the image visually, whether it is real, virtual, upright or inverted. All measurements are taken in 'units' which can represent whatever you want.

The program can be very useful in education, being part of the Physics 'O' level syllabus.

```
10 REM LIGHT BY PETER DONN '82
20 *TV 255
30 *KEY 0 a
40 *KEY 1 b
50 *KEY 2 c
60 *KEY 3 d
70 *KEY 4 e
80 *KEY 5 f
90 F=100.O=100.OD=200
100 @%=80000020A
110 IF OD<1 OD=OD+10 GOTO 330
120 IF O<0 O=0
130 MODE5
140 VDU19,0,4;0;
150 FOR C=1 TO 3 VDU19,C,4;0; NEXT
160 COLOUR3
170 MOVE0,512.DRAW1280,512
180 MOVE640,312:DRAW640,712
190 GCOL0,1
200 MOVE(640-OD),512:DRAW(640-OD),O+512.
    GCOL0,2·DRAW640,O+512
210 IF OD-F=0 THEN 430
220 ID=(F*OD)/(OD-F)
230 MG=(ID/OD)
240 IYC=512-(MG*O)
250 DRAW ID+640,IYC
260 DRAW 640+ID,512
270 MOVE 640-OD,512+O:DRAWID+640,IYC
280 FOR C=1 TO 3.VDU19,C,C;0;.NEXT
290 PRINT CHR$80,''FOCAL LENGTH  ";F/10;
·   ''OBJECT DIS.  .";OD/10
300 IF OD-F=0 PRINT"IMAGE DIS.  :INF." ELSE
    PRINT "IMAGE DIS.   ";ID/10
310 PRINT "HEIGHT OBJECT.";O/10
320 IF OD-F=0 PRINT"HEIGHT IMAGE  NONE"
    ELSE PRINT"HEIGHT IMAGE  "
;-MG*O/10
330 *FX 15,1
340 A$=GET$
350 IF A$="a" OD=OD+10
360 IF A$="b" OD=OD-10
370 IF A$="c" D=O+10
380 IF A$="d" D=O-10
390 IF A$="e" F=F-10:IF F<0 F=F+10
400 IF A$="f" F=F+10
410 GOTO 110
420 END
430 X=640.Y=-(O*X/F)+O
440 DRAW X+640,Y+512
450 MOVE 640-OD,O+512:DRAW X+640,(Y-F)+512
460 GOTO 280
```

Sound and vision

***Deborah Annette** completes har two-part senes on m/c with a sound and pnnt controller*

Sound Controller

The Basic call to *Beep* function is located at address 1016 To program the computer to produce sound from the internal speaker you need to make a call to address 949 where variables such as pitch and duration of note can be entered directly in *h* and *de* rather than from the stack Using the machine code loader from last week try the following

```
LD HL NN    33 100 1   PITCH
LD DE NN    17 156 3   DURATION
CALL NN     205 181 3  CALL TO ADDRESS 949
RET         201        RETURN TO BASIC
```

The Rom routine at address 949 uses the IX register and also contains *Disable Interrupt (DI)* and *Enable Interrupt (EI)* as the first and last commands Only the sound function is enabled — all other activities stop

This routine may be coupled with the keyboard controller *(Popular Computing Weekly*, March 17-23) to indicate that an acceptable entry has been received For example

```
RST 56       255
LD A (NN)    58   8 92
CP N         254 119
JR NZ DIS    32 255
LD HL NN     33 100 9
LD DE NN     17 100 9
CALL NN      205 181 3
RET          201
```

will only respond to depressing the *W* key and will *Beep* an indication that it has done so This can of course be extended to include a range of keys if necessary and is a very useful mug trap

Multiple *Beep* calls may be used to produce a range of notes but require the registers to be saved before the call to *Beep* For example

```
LD BC NN     1 30 9    Reduction in Pitch —
                       Number of notes
LD HL NN     33 255 9  Pitch
LD DE NN     17 100 2  Duration
PUSH HL      229 }
PUSH DE      213 }     Save Registers
PUSH BC      197 }
CALL NN      205 181 3 Call BEEP
POP BC       193 }
POP DE       209 }     Recover Registers
POP HL       225 }
LD A L       125 }
SUB C        145 }     Decrease Pitch
LD L A       111 }
DJNZ DIS     16 242    Next Note
RET          201       Return to BASIC
```

Print Controller

As the Spectrum memory map is non-sequential (see how the Psion logo is built up when running the *Horizons* tape), it is not possible to *Poke* user defined graphics (UDG) or characters to a specific screen location using normal machine code methods With the Spectrum the *Rst 16* function must be used for this purpose

First, the accumulator is *Loaded* with the function to be performed (see Table 1) and then the value of the function Note *Rst 16* uses the alternative set of registers (you were able to use these registers in ZX81 machine code routines — you cannot with the Spectrum)

Enter program one It prints a green coloured hash on a red square towards the bottom left-hand side of the screen You may alter the values of variable 'd' and 'e' to correspond to any colour you wish (0-7) and the variables 'b' (0-31) and 'c' (0-20) to any position you require on the screen Character changes are affected by altering the variable 'h' See pages 183 to 188 of your Sinclair manual for suitable alternatives

Program two combines keyboard control sound and graphics with colour The program operates by waiting for you to press the 'x' key then it sounds a low note prints six colours and characters in a row and then sounds a high note ■

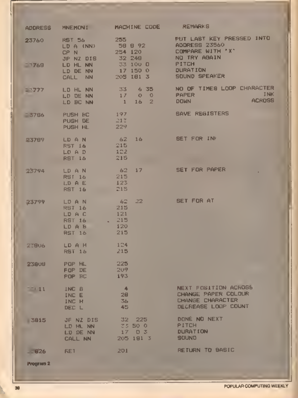
Table 1

```
                                      REMARKS

[illegible] HL  NN   [illegible]          -           CHARACTER
[illegible] DE  NN   [illegible]      PAPER           INK
LD  BC  NN   [illegible]              DOWN            ACROSS
[illegible] A   N    62 [illegible]       SET FOR INK
RST 16       215
LD  A   D    122                      INK (D) INTO A
RST 16       215
LD  A   N     62  17                  SET FOR PAPER
RST 16       215
LD  A   E    123                      PAPER(E) INTO A
RST 16       215
LD  A   N     62  22                  SET AT
RST 16       215
LD  A   C    121                      DOWN(C) INTO A
RST 16       215
LD  A   B    120                      ACROSS (B) INTO A
RST 16       215
LD  A   H    124                      CHARACTER(H) INTO A
RST 16       215
RET          201                      RETURN TO BASIC

PROGRAM 1
```

Turn to page 30



```
ADDRESS   MNEMONI        MACHINE CODE      REMARKS

23760     RST 56          255              PUT LAST KEY PRESSED INTO
          LD A (NN)        58 8 92         ADDRESS 23560
          CP N            254 120          COMPARE WITH 'X'
          JP NZ DIS        32 248          NO TRY AGAIN
23768     LD HL NN         33 100 0        PITCH
          LD DE NN         17 150 0        DURATION
          CALL  NN        205 181 3        SOUND SPEAKER

23777     LD HL NN         33   6 35       NO OF TIMES LOOP CHARACTER
          LD DE NN         17   0  0       PAPER                   INK
          LD BC NN          1  16  2       DOWN                 ACROSS

23786     PUSH BC         197              SAVE REGISTERS
          PUSH DE         213
          PUSH HL         229

23789     LD A N           62  16          SET FOR INK
          RST 16          215
          LD A D          122
          RST 16          215

23794     LD A N           62  17          SET FOR PAPER
          RST 16          215
          LD A E          123
          RST 16          215

23799     LD A N           62  22          SET FOR AT
          RST 16          215
          LD A C          121
          RST 16          215
          LD A B          120
          RST 16          215

23806     LD A H          124
          RST 16          215

23808     POP HL          225
          POP DE          209
          POP BC          193

23811     INC B             4              NEXT POSITION ACROSS
          INC E            28              CHANGE PAPER COLOUR
          INC H            36              CHANGE CHARACTER
          DEC L            45              DECREASE LOOP COUNT

23815     JP NZ DIS        32  225         DONE NO NEXT
          LD HL NN         33 50 0         PITCH
          LD DE NN         17  0 3         DURATION
          CALL NN         205 181 3        SOUND

23826     RET             201              RETURN TO BASIC
```

Program 2

On the trail . . .

***Keith and Steven Brain** show you how to add cursor control to your own programmes*

At the left and right hand sides of your keyboard are the four cursor control ("arrow") keys which are very useful for controlling left and right, and up and down movement in games. Only 'up' and 'left' are displayable characters (*Chr$(126)* and *Chr$(127)*). While the 'up' arrow can be practically used in a string comparison like

```
10 IF A$="^" THEN
```

the 'left' arrow can only be obtained by *Shift* (*Up Arrow*) so really they are best forgotten!

In general, the cursor keys are only used in programs by looking for their ASCII codes.

ASCII codes for cursor keys

	shift not pressed	shift pressed
left arrow	8	21
right arrow	9	93
up arrow	94	95
down arrow	10	91

The codes are different depending on whether you are in upper or lower case and to avoid chaos in your games by accidentally moving into the wrong case a 'belts and braces' approach which checks for both is best!

Mapping it out

Movement around the screen must take into account how the screen is organised ("mapped"). The Dragon text screen consists of 16 lines, each of 32 characters. It is mapped sequentially from 0 to 511 (starting from the top left corner and returning to the left of the screen at the start of each new line).

Let's start at point *P* in the middle of the screen (position 238) and think about moving left and right. All we need to do is subtract one from *P* or add one to *P* each time you press that key.

```
110 P=238
120 PRINT @ P,"*"
140 A$=INKEY$:IF A$="" THEN 140 ELSE A=ASC(A$)
160 IF A=8 OR A=21 THEN P=P-1
160 IF A=9 OR A=93 THEN P=P+1
200 GOTO 120
```

If you try that, you'll notice that if you go on far enough you move onto the line above or below.

Going the long way round is rather pointless, so lets turn our asterisk into a "turtle" which will move immediately at our command in any of the four directions, leaving a trail behind him. To move up and down a line directly you simply subtract from or add 32 (line length) to *P* in the same way.

```
170 IF A=94 OR A=95 THEN P=P-32
180 IF A=10 OR A=91 THEN P=P+32
```

Doesn't that give you a feeling of power as the poor little asterisk is forced to move wherever you send it! But watch out, if you stray too far, your turtle will fall victim to an *Fc Error* as only values of *P* from *0* to *511* are allowed! You therefore need to add in a check that you have not fallen off the top or bottom of the screen.

```
190 IF P<0 THEN P=0
200 IF P>511 THEN P=511
```

There are several simple games (usually named after snakes or other creepy-crawlies!) which are based on avoiding the trail left behind you. To start with you need to look at what is already in the new print position and compare this with your own character. We can do this by *Peeking* at what is on the text screen. As the start of this (print position 0) is at memory location 1024 we need to add this number to *P*, before we look.

Unfortunately, you will find that if you print a character onto the screen, and then *Peek* to see what it is, you get rather a surprise as *Peek* may not give you the ASCII code of the character. (This is because of the way the Dragon codes characters internally, which is not ASCII.) If you want to find out the corresponding *Peek* values and ASCII codes for the whole character set, you can use this little routine.

```
500 FOR N = 1 TO 255:PRINT CHR$(N):NEXT
510 FOR N = (1023+1) TO (1023+255):PRINT PEEK(N):NEXT
```

The *Peek* value for "*" is 96, so we can use

```
220 W=PEEK(1024+P))
230 IF W = 96 THEN 300
300 PRINT @ 0,"CRASH!"
```

To keep a record of how far you got before you crashed, add a distance variable which increments with each success.

```
270 D=D+1
310 PRINT "SCORE = ";D
```

If you want to move without leaving a trail, you need to erase the last point as you print the next. You can do this most simply by adding a devastating *Cls* to wipe the screen clean in one fell swoop — *210 Cls* — but if you take a more subtle approach you can be much more selective, and leave the rest of the screen display intact. You need to remember the last print position and print a blank space there just before the new asterisk is printed. To do that we will bring in a new variable *L* (for 'last') which is set equal to *P*, before this is changed.

```
130 L=P
210 PRINT @ L," "
```

Because of the order of program lines, the "*" is displayed for most of the time as erasing only occurs when the position changes.

Hungry horror

Let's put these ideas together into a more interesting game where a strange "Hungry Horror" must search a box for food so that it does not starve. But it must not make the mistake of eating itself!

First we draw the box, leaving the bottom line clear so that automatic screen scroll does not occur.

```
10 CLS2
20 PRINT @ 0,STRING$(33,128)
30 FOR N = 63 TO 479 STEP 32:PRINT @ N,CHR$(128)+CHR$(128):NEXT
40 PRINT @ 448,STRING$(31,128)
```

and then a random amount of food is placed in random positions.

```
50 Q=RND(20)
60 FOR N=1 TO Q
70 FP=RND(480)-1
80 PRINT @ FP,"*"
90 NEXT
```

If you do not like to see food stuck to the wall, just change these two routines around, when any food in unsuitable positions will vanish. Computer logic isn't always as good as common sense!

The beast starts off with a full stomach (*F=20*) and adds *10* to its food supply (*F*) every time it finds a "*" (*Peek* value 122)

```
240 IF W = 122 THEN F=F+10
```

but it uses one food unit each time it moves, and starves if there is none left.

```
260 F=F-1
280 IF F<1 THEN 330
```

Start Sequence

NO
YES
PICK UP STARTING FOOD
MOVE TO SCREEN CENTRE
PRINT *
REMEMBER THIS POSITION
CHECK KEY ROUTINE

```
330 CLS0
340 PRINT @ 224  YOU STARVED AFTER D-
      MOVES!
350 SOUND1 50
360 RUN
```

If it hits the wall of the box it loses 5 food

```
390 IF W = 128 THEN F=F-5
```

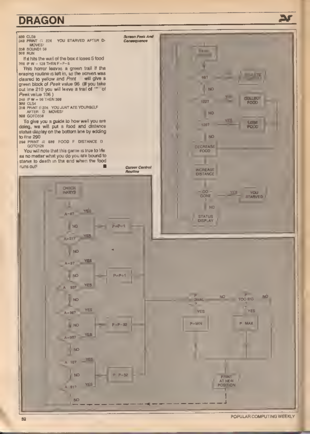
This horror leaves a green trail if the erasing routine is left in, as the screen was cleared to yellow and *Print* will give a green block of *Peek* value 96 (If you take out line 210 you will leave a trail of "" of *Peek* value 106)

```
240 IF W = 96 THEN 300
300 CLS4
310 PRINT @224  YOU JUST ATE YOURSELF
      AFTER  D  MOVES!
300 GOTO350
```

To give you a guide to how well you are doing, we will put a food and distance status display on the bottom line by adding to line 290

```
290 PRINT @ 480  FOOD  F  DISTANCE  D
      GOTO120
```

You will note that this game is true to life as no matter what you do you are bound to starve to death in the end when the food runs out! ■



```
10 CLS2
20 PRINT @ 0,STRING$(33,120);
30 FOP N = 63 TO 447 STEP 32
PPINT @ N,CNP$(120),CNR$(128), NEXT
40 PRINT @ 449,STRING$(31,120),
50 O=RND(20)
60 FOR N=1 TO R
70 FP=RND(480)-1
80 PRINT @ FP," ",
90 NEXT
100 F=20
110 P=238
120 PRINT @ P,"*",
130 L=P
140 A$=INKEY$ IF A$="" THEN 140
ELSE A=ASC(A$)
150 IF A=8 OR A=21 THEN P=P-1
160 IF A=9 OR A=93 THEN P=P+1
170 IF A=94 OR A=95 THEN P=P-32
180 IF A=10 OR A=91 THEN P=P+32
190 IF P< 0 TNEN P=0
200 IF P>511 THEN P=511
210 PRINT @ L," ",
220 W=(PEEK(1024+P))
230 IF W=96 THEN 300
240 IF W=122 TNEN F=F+10
250 IF W=120 TNEN F=F-5 SOUND1,5
260 F=F-1
270 D=D+1
280 IF F<1 THEN 330
290 PRINT @ 480 "FOOD";F,"DISTANCE
,D, GOTO120
300 CLS4
310 PRINT @224,"YOU JUST ATE
YOURSELF AFTER", D,"MOVES!"
320 GOTO350
330 CLS0
340 PRINT @ 224,"YOU STARVED
AFTER",D,"MOVES!"
350 SOUND1,50
360 RUN
```


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WANTED BBC Micro B for £300-£320 Tel Crewtherne 4151 anytime

WANTED ZX80 with all leads, £15 Tel Maidstone 681864 (any time)

WANTED Introduction to Basic Part 1 Tel Stevenage 51766 John

BBC MODEL B, less than three months old Tel Earls Colne 3557

WANTED BBC Micro A. Tel Guildford 38500 (4 pm)

48K SPECTRUM WANTED for ZX81 + 16K and £117.50 worth of software Possibly settle for 16K Spectrum A Munro 70 Meadow Park Street, Dennistoun Glasgow G31 2ST

VIC20 Cloudburst or Satellites/meteorites cartridge in exchange for other games Tel 0438 811634

SPECTRUM, IN EXCHANGE FOR MATTEL INTELLIVISION 20 computer games machine (as new) with cartridges superb graphics Cost £180 Tel 01-846 2244

WANTED Vic20 + 16K Ram + cassette + cartridges required exchange for OM2N + 200mm telephoto lens and flash Tel 0584 23534 evenings

WANTED ZX81 Internal 32K or 64K Ram Tel 01 238 9048 day 0265 683071 eves. Ask for Morgan

WANTED Home computer or Dragon printer plus software Exchange for sound projector and silent cine camera plus screen Tel Telford 581237

WANTED Vic20 tape unit good condition Tel 01-890 6510 Feltham

DRAGON 32 + Centronics printer Swap for NewBrain + accessories Tel 01-856 1168

WANTED SPECTRUM 48K, offers ZX81 1K in part exchange Tel Beeston 723516

DRAGON 32 for around £170 Offers to Jim Monahan, Waterford 82253 (Ireland) after 7 pm

BBC, Model B 1.2 MOS (preferably) Tel Hull 848517

BBC Model B offers Tel 01-530 2600

WANTED VICMEN CASSETTE + joystick. Tel St Alban 750696

PRINTER FOR PET Dual drive floppy discs for Pet Tel Brentwood 231480



MYSERY TOUR

J M Danes of Northfield, Birmingham, writes

Q **I have a ZX Spectrum, which is my first computer, and I am enjoying learning all the mysteries. One thing that I am interested in is any way of running ZX81 programs on the Spectrum.**

A Almost without exception, ZX81 programs can be run on a Spectrum, but some alterations are needed — see *Popular Computing Weekly*, January 13, Letters, for details. Also, the 16K Spectrum only has 9K of usable memory, so some 16K ZX81 programs may take up too much room.

SHY SINCLAIR

Malcolm Singh of Westgate, Dartford Kent writes

Q **Please could you tell me if the microdrive for the Sinclair Spectrum will (when released on the market) be usable for the Dragon.**

A I have this funny idea for a Sci-Fi story where the hero buys a home computer, called the Binnatone Electron, that has coupled ZX microdrives.

I am still getting a lot of questions about the microdrive, but Sinclair is still very reticent, as he has been for the last nine months. The brackets in your questions are very apt.

However, with the recent announcement that a special interface will be needed to use the microdrives with the Spectrum, I think it would be wise to stop regarding the microdrives as a ZX add-on, and class them much more as a general computer peripheral. I remember saying four or five months ago, that if the microdrives turn out to be all they are cracked up to be, then they would be more important to the computer market than the Spectrum.

I guess that when the microdrives are eventually released, they will be aimed at a range of home micros. Once they have proved themselves reliable, I am sure a range of interfaces will appear.

For all those who have asked when the microdrives will appear, I am afraid I do not know. The microdrive case was shown at the Earls Court show last April, but there has been little sign of it since then. Perhaps it will appear at the next Earls Court Show in June.

BLACK AND WHITE

M J Vale of Coleshill Road, Hodge Hill, Birmingham, writes

Q **I am thinking about buying a Newbrain microcomputer. Will I be able to see its 80 column display and high-res graphics (640 x 250) on a normal 625 line, black and white, television?**

A Yes. A normal television should be able to deal with any resolution that can be accessed by a normal microcomputer. The only limit is size — an 80 column display on a small screen will be harder to see, but all the information will be there.

CARD SHARP

Andrew Simpson of Stretford, Manchester writes

Q **I hope to be getting an Oric soon, as it looks to be as good as the Spectrum and cheaper. I am new to computing, but I would like to know if there is any way I could write a games program (eg, a card game), where each hand was shown on a different television screen. I have looked through several magazines and no one seems to have mentioned it, though I am sure that it would be very useful. I know that more than one joystick can be used, so why not more than one television?**

A In short, you cannot use more than one television because you only have one video output and one set of video circuitry in the computer. This is true of all the home micros and many larger machines as well. To get the effect that you want you would have to connect two computers together, though one would have to be used as the master.

As for joysticks, they control input not output. In fact the multiplexer used for two or more joysticks does not put a signal in at the same time from each joystick, rather the input from each is read alternatively. But this is so fast it cannot be detected by the human eye.

BUZZ, BUZZ!

E C De Corte of Barmby Moor York writes

Q **When switched on, my Spectrum prevents reception on a transistor radio in an adjoining room, since it causes the latter to emit a loud pitched buzz. Is this a fault of the individual machine, or is it a problem with the Spectrum in general? If it is a general characteristic, then have you any ideas how I can overcome the problem?**

A Normally it is the Spectrum that buzzes, so this is a change. This should not happen and the Spectrum is at fault.

Unlike America, where there is a complex web of law governing any form of extraneous broadcasting, there is little on the statute books in this country governing the shielding of appliances. However, in this case it is probably a good thing as the interference is indicative that there is something wrong with your Spectrum. I would suggest that you send it back as soon as possible.

The fault might well be with the power supply — this sort of effect is possible if it is being overloaded. Alternatively, it might be something in the video circuitry. It might be useful to see whether it causes the same problem on other radios. I suggest that you attach a brief note to the machine stating that the problem is interference with a radio.

AUSTRALIAN RELEASES

Richard Herbert of Harris Street, Laurenceton, Tasmania Australia writes

Q **I would like to know if some of the latest releases on the British computer market, namely the Spectrum, Lynx, Oric and Dragon, are going to be released in Australia. I would like to know the release date and the cost in Australian dollars.**

A I telephoned the various people involved. They were all quite helpful, but not everyone could give me a definite answer and no-one a price.

The Spectrum will certainly be available within the next two to three months, from all the usual outlets. The Lynx and Oric will be available at some time, but there are no definite dates. Camputers, manufacturers of the Lynx, are negotiating with potential dealers now and Oric will be starting soon.

Dragon were the most positive and gave me April as the launch month in Australia. The dealership will be through the Hanimex Organisation, Brookvale, New South Wales. However, a price has not yet been finalised.

Is there anything about your computer you don't understand, and which everyone else seems to take for granted? Whatever your problem *Peek* it to Ian Beardsmore and every week he will *Poke* back as many answers as he can. The address is *Peek & Poke, PCW*, Hobhouse Court, 19 Whitcomb Street, London WC2 7HF

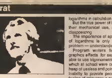
Top 10

Books

1	(1)	Enter the Dragon, *Carter*	(Melbourne House)
2	(8)	Creative Graphics on the BBC Micro, *Cownie*	(Acornsoft)
3	(2)	Assembly Language Programming for the BBC Micro, *Birnbaum*	(Macmillan)
4	(4)	The Working Dragon 32, *Lawrence*	(Sunshine)
5	(6)	Compute!'s First Book of Vic, *various authors*	(Compute!)
6	(3)	Spectrum Machine Language for the Absolute Beginner, *Tang*	(Melbourne House)
7	(—)	Programming the Z80, *Zaks*	(Sybex)
8	(9)	Vic Programmer's Reference Guide, *Finkel*	(Commodore)
9	(—)	Vic Innovative Computing, *Ramshaw*	(Melbourne House)
10	(—)	Compute!'s Second Book of Atari, *various authors*	(Compute!)

(Figures compiled by Watford Technical Books, Watford (0923 23324))
(Last week's figures in brackets)

Ziggurat



The square root of −1

Not long ago, I touched on logarithms and some of the ways in which a knowledge of them could help in understanding certain aspects of computers and mathematical functions

What I found to be very interesting about the logarithm article was the reaction from the more venerable members of society (ie those over the age of 20) Many expressed the considered opinion that the whole piece was a waste of time Apparently it said nothing new and everybody knows about logarithms

My protestations that the application of logarithms to exponentiation and the numerical accuracy of computers was new, were treated with pity I then asked around amongst my young friends (ie less than 20 years old) to find out what they knew of logarithms

Most, I found had no experience of logarithms before the third year in secondary school — and one third-year pupil still had not encountered such esoteric topics Asking what they *did* know was more revealing for few had any true understanding of the potential of logarithms

Until recently, logarithms were an important part of any secondary school maths syllabus they had to be used for calculations of any complexity in maths or science

Because they were used in so many different applications we learnt their limits quite well Now that calculators are so common the need for logarithms in calculation has nearly vanished

But the true power of logarithms goes beyond their mechanical use, and that seems to be disappearing

The importance of application in the learning of logarithms is only one facet of a wider problem — understanding is helped by use

Program writers find that for complex graphics effects for example, they need to be able to use trigonometrical functions Functions which at school were consigned to the rubbish heap of useless and pointless knowledge Is this inability to provide people at school with any feeling of relevance a new problem? I think not.

Seymour Papert (he of *Mindstorms* and the *Monkey Puzzle*) was featured on a television programme recently Papert argued that mathematics should be taught in a *concrete* way His way was via the use of the programming language Logo and Turtle Graphics

The program was very interesting but — I think — rather wrong-headed Children were learning to manipulate turtles on screens, and on the floor but — I then wondered — how would they learn in the turtle-maths world about the power of logarithms as the turtle world is geometrical?

Earlier that same evening (on a different channel) there was a programme aimed at helping people to work out the money they should be given in change I wondered if Turtle Graphics would help here Just because there is an increasing use of calculators and electronic tills should we let our minds vegetate?

There seem to be many things wrong with our present (and past) methods of education — but those problems will be worsened by a facile attempt to duck the basic problem, by saying we can do it with pictures The basic problem seems to be that many people have a total lack of understanding of numbers

Seymour Papert says of sums 'These absurd little repetitive exercises have only one merit. They are easy to grade'

But, if people were more experienced, they would not *try* to find the square root of −1 (even if the calculator allowed them to so do) ■

Boris Allan

Puzzle

Bull's-eye!

The village of Muddlecombe has its own peculiar game of darts played on the Muddlecombe board consisting of only seven numbered sections There is no bullseye but doubles and trebles can be scored as on a standard dart board The winner is the first player to score exactly an agreed total

You are playing in the final of the inter village championship and your opponent needs only a throw of 46 to win However it is your throw and you have to score exactly 115 points to win the match

You have three darts Which numbers would you aim for?



Solution to Puzzle No 43

The program tests all possible values of the number of paints and brushes bought The balance of the 100 items is then assessed and the total cost found If this equals 10,000F then the value is printed

```
10 FOR P=1 TO 98 20 FOR B=1 TO 98 30 LET C=
100-(P+B) 40 LET COST = P*300 + B*700 +C*90
50 IF COST = 10000 THEN PRINT "Number of
paints=" P " Number of brushes= "B " Number of
crayons= "C 60 NEXT B 70 Next P
```

This shows that the only possibility is 7 paints 5 brushes and 88 crayons

Winner of Puzzle No 43

The winner is Phil Allen Flambard Avenue, Christchurch Dorset who receives £10

Top 10

Atari

1	(1)	Defender	(Atari)*
2	(5)	Miner 2049er	(Big Five)
3	(6)	Star Raiders	(Atari)*
4	(—)	Ghost Encounters	(J + V Software)
5	(—)	Astro Chase	(First Star Software)*
6	(10)	Wizard of Wor	(Roklan)
7	(2)	Fort Apocalypse	(Synapse)
8	(—)	Gorf	(Roklan)
9	(—)	Shadow	(Adventure International)
10	(—)	Space Invaders	(Atari)*

*Cartridge 13K cassette

(Figures compiled by Calisto Computers Birmingham 021-632 6458)

Vic20

1	(2)	Abductor	(Llamasoft)
2	(—)	Laser Zone	(Llamasoft)
3	(1)	Grid Runner	(Llamasoft)
4	(6)	Arcadia	(Imagine)
5	(5)	Andes Attack	(Llamasoft)†
6	(3)	Frog	(Interceptor Micros)
7	(—)	Krazy Kong	(Interceptor Micros)
8	(7)	Quackers	(Rabbit)
9	(10)	Traxx	(Llamasoft)†
10	(—)	Night Crawler	(Rabbit)

†Requires 3K or 16K

(Figures compiled by Vic Centre London 01-992 9904)

Spectrum

1	(7)	Black Crystal	(Carnell)*
2	(2)	Time Gate	(Quicksilva)
3	(1)	Penetrator	(Melbourne House)
4	(4)	Arcadia	(Imagine)
5	(8)	Frogger	(A&F)
6	(6)	Master File	(Campbell Systems)
7	(6)	Vu-3D	(Psion)*
8	(—)	Galaxians	(Artic)
9	(5)	Scramble	(M Icrogen)
10	(10)	Hobbit	(Melbourne House)*

*Requires 48K

(Figures compiled by Buffer Micro Shop London 01 769 2887)

BBC*

1	(—)	Wordwise	(Computer Concepts)†
2	(—)	Chess	(Computer Concepts)
3	(—)	Lego II	(Computer Concepts)
4	(—)	Hitch-hiker	(Computer Concepts)
5	(—)	Algebraic Manipulation	(Acornsoft)
6	(3)	Planetoids	(Acornsoft)
7	(—)	Monsters	(Acornsoft)
8	(5)	Castle of Riddles	(Acornsoft)
9	(9)	Snapper	(Acornsoft)
10	(—)	Tree of Knowledge	(Acornsoft)

All Model B †Cartridge.

(Figures compiled by Micro Management Ipswich 0473 59181)

ZX81*

1	(1)	Black Crystal	(Carnell)
2	(6)	Kong/Dracula	(Tony Roberts)
3	(—)	Galaxians	(Artic)
4	(5)	Flight Simulation	(Psion)
5	(4)	Sea War	(Panda)
6	(5)	3D Defender	(JK Greye)
7	(8)	Trader	(Pixel)
8	(10)	Fantastic Voyage	(Fricade)
9	(2)	Gulp II	(Campbell Systems)
10	(—)	Protector	(Abacus)

All 16K

(Figures compiled by Buffer Micro Shop London 01 769 2887)

Dragon

1	(1)	Rabbit Invasion	(Microdeal)
2	(2)	Dragon Trek	(Salamander)
3	(7)	Space Race	(Compusense)
4	(3)	Blackman	(Microdeal)
5	(6)	Alcatraz II	(Microdeal)
6	(4)	Invaders Revenge	(Microdeal)
7	(5)	Ghost Attack	(Dragon Data)
8	(8)	Fun and Games	(Shards)
9	(—)	Games Pack 2	(Abacus)
10	(—)	Lion Heart	(Peaksoft)

(Figures compiled by Dragon Dungeon Ashbourne 0335 44626)